

WU: Perform the operation

$$2 \begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix} - \begin{bmatrix} -1 & 4 \\ 5 & -2 \end{bmatrix} = \begin{bmatrix} & \\ & \end{bmatrix}$$

$$\begin{bmatrix} 2 \cdot 3 + 1 & 2 \cdot 1 - 4 \\ 2 \cdot 2 - 5 & 2 \cdot 4 - (-2) \end{bmatrix}$$

$$\begin{bmatrix} 6 + 1 & 2 - 4 \\ 4 - 5 & 8 + 2 \end{bmatrix}$$

$$\begin{bmatrix} 7 & -2 \\ -1 & 10 \end{bmatrix}$$

$$3 \begin{bmatrix} y & 7 \\ \textcircled{4} & -3 \end{bmatrix} + \begin{bmatrix} 4 & -3 \\ \textcircled{x} & 1 \end{bmatrix} = \begin{bmatrix} 20 & 18 \\ \textcircled{12} & -8 \end{bmatrix}$$

P191 #24-26

Solve for x and y .

Write an equation for x and y .

$$3 \cdot 4 + x = 12$$

$$\cancel{12} + x = \cancel{12}$$

$$\boxed{x = 0}$$

$$\begin{cases} 3y + 4 = 20 \\ 3y = 16 \\ y = \frac{16}{3} \text{ or } 5.\bar{3} \end{cases}$$

$$24) \begin{bmatrix} -1 & 3x \\ -4 & 5 \end{bmatrix} = \begin{bmatrix} -1 & -18 \\ 2y & 5 \end{bmatrix}$$

$3x = -18$ $-4 = 2y$

$$\begin{bmatrix} -2x & 6 \\ 1 & -8 \end{bmatrix} + 2 \begin{bmatrix} 5 & -1 \\ -7 & 6 \end{bmatrix} = \begin{bmatrix} -9 & 4 \\ -13 & y \end{bmatrix}$$

$$-2x + 2 \cdot 5 = -9 \quad -8 + 2 \cdot 6 = y$$

$$x = \frac{19}{2} \quad y = 4$$

$$2 \begin{bmatrix} 8 & -x \\ 5 & 6 \end{bmatrix} - \begin{bmatrix} 3 & -9 \\ 10 & -4y \end{bmatrix} = \begin{bmatrix} 13 & 4 \\ 0 & 16 \end{bmatrix}$$

$$2(-x) - 9 = 4$$

$$-2x + 9 = 4$$

$$-2x = -5$$

$$x = 2.5$$

$$2(6) + 4y = 16$$

$$12 + 4y = 16$$

$$4y = 4 \quad y = 1$$

Multiply Matrices

The "inside" dimensions of 2 matrices must match in order to multiply
rows x columns

$$A = m \times n$$

$$B = n \times m$$

dimensions must
match

$$A \cdot B = (m \times n)(n \times m)$$

will become
the new matrix

$$= m \times m$$

Ex] $(2 \times 1)(1 \times 3) = (2 \times 3)$

Ex] $(2 \times 2)(3 \times 2) = \text{NO! don't match}$ 😞

$$\begin{array}{c} 2 \times 2 \\ \left[\begin{array}{cc} a & b \\ c & d \end{array} \right] \end{array} \cdot \begin{array}{c} 2 \times 2 \\ \left[\begin{array}{cc} e & f \\ g & h \end{array} \right] \end{array} = \begin{array}{c} 2 \times 2 \\ \left[\begin{array}{cc} a \cdot e + b \cdot g & a \cdot f + b \cdot h \\ c \cdot e + d \cdot g & c \cdot f + d \cdot h \end{array} \right] \end{array}$$

$$(2 \times 3)(3 \times 2) = (2 \times 2)$$

$$\begin{bmatrix} 0 & 1 & 2 \\ 3 & 4 & 5 \end{bmatrix} \begin{bmatrix} 6 & 7 \\ 8 & 9 \\ 10 & 11 \end{bmatrix} = \begin{bmatrix} 0 \cdot 6 + 1 \cdot 8 + 2 \cdot 10 & 0 \cdot 7 + 1 \cdot 9 + 2 \cdot 11 \\ 3 \cdot 6 + 4 \cdot 8 + 5 \cdot 10 & 3 \cdot 7 + 4 \cdot 9 + 5 \cdot 11 \end{bmatrix}$$

$$= \begin{bmatrix} 0+8+20 & 0+9+22 \\ 18+32+50 & 21+36+55 \end{bmatrix} = \boxed{\begin{bmatrix} 28 & 31 \\ 100 & 112 \end{bmatrix}}$$

Practice p 199

#10-18

* Show by hand

rows x columns

$(2 \times 1)(3 \times 1)$ dimension mismatch

$$[1 \times 2][2 \times 1] = [1 \times 1]$$

$$10) [3 \quad -1] \begin{bmatrix} 5 \\ 7 \end{bmatrix} = [3 \cdot 5 + -1 \cdot 7]$$

$$\begin{aligned} &= [8] \\ &= [2 \times 2] \\ 11) \begin{bmatrix} 1 \\ 4 \end{bmatrix} [-2 \quad 1] &= \begin{bmatrix} 1 \cdot -2 & 1 \cdot 1 \\ 4 \cdot -2 & 4 \cdot 1 \end{bmatrix} \end{aligned}$$